

MTC 6638.7 (39-21(51753)B)
PATENT

Amendments to the Claims:

This listing of claims will replace the prior version of claims in the application:

Listing of Claims:

Claim 1. (Original) A process for the preparation of a carboxylic acid salt by dehydrogenation of a primary alcohol, the process comprising:

contacting an alkaline mixture comprising said primary alcohol with a dehydrogenation catalyst, said catalyst comprising a copper-containing active phase at the surface thereof and a supporting structure that is resistant to deformation under the conditions of the dehydrogenation reaction.

Claim 2. (Original) A process as set forth in claim 1 wherein said supporting structure comprises a non-brittle material that has a yield strength of at least about 100 MPa.

Claim 3. (Original) A process as set forth in claim 2 wherein said supporting structure comprises a metal sponge containing at least about 15% by weight non-copper metal and at least about 10% by weight copper.

Claim 4. (Original) A process as set forth in claim 2 wherein the active phase at the surface of said catalyst comprises at least about 50% by weight copper.

Claim 5. (Original) A process as set forth in claim 4 wherein said active phase contains less than about 1% by weight of a metal oxide other than cuprous oxide.

MTC 6638.7 (39-21(51753)B)
PATENT

Claim 6. (Original) A process as set forth in claim 4 wherein said active phase contains less than about 1% by weight of cuprous oxide.

Claim 7. (Previously presented) A process as set forth in claim 4 wherein said active phase contains at least about 1% by weight of a supplemental metal selected from the group consisting of chromium, titanium, niobium, tantalum, zirconium, vanadium, molybdenum, manganese, tungsten, cobalt, nickel, bismuth, tin, antimony, lead, germanium, and mixtures thereof.

Claim 8. (Original) A process as set forth in claim 2 wherein said supporting structure comprises a metal containing at least about 10% by weight non-copper metal.

Claim 9. (Original) A process as set forth in claim 8 wherein said catalyst comprises a metal sponge.

Claim 10. (Original) A process according to claim 8, wherein said non-copper metal comprises metal having a reduction potential which is less than about +343 mVolts vs. NHE.

Claim 11. (Previously presented) A process according to claim 8, wherein said metal support comprises at least about 10% by weight of a non-copper metal selected from the group consisting of nickel, zinc, tin, cobalt, iron and combinations thereof.

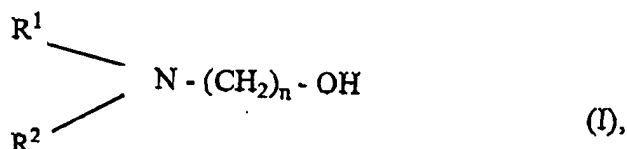
Claim 12. (Original) A process as set forth in claim 8 wherein said catalyst comprises a surface stratum comprising said active phase, said surface stratum containing between about 0.005 and about 0.5 grams of copper per gram of said supporting structure.

MTC 6638.7 (39-21(51753)B)
PATENT

Claim 13. (Original) A process as set forth in claim 1 wherein said catalyst comprises a metal sponge support having deposited thereon a copper-containing outer stratum.

Claim 14. (Currently amended) A process as set forth in claim 8 wherein said catalyst comprises a particulate catalyst ~~the particles of which have the structure of claim 2.~~

Claim 15. (Original) A process according to claim 8, wherein said primary alcohol comprises a compound corresponding to the formula:



wherein n is an integer ranging from 2 to 20; and R¹ and R² are independently hydrogen, hydrocarbyl, or substituted hydrocarbyl.

Claim 16. (Currently amended) A process according to claim [8] 15, wherein said carboxylic acid salt comprises an alkali metal salt of (a) iminodiacetic acid, (b) glycine, or (c) an N-alkyl-glycine.

Claim 17. (Currently amended) A process according to claim [8] 16, wherein said process further comprises phosphonomethylating said carboxylic acid salt to form N-(phosphonomethyl)iminodiacetic acid or a salt thereof.

Claim 18. (Currently amended) A process according to claim 17, wherein said process further comprises oxidizing said N-(phosphonomethyl)iminodiacetic acid or a salt thereof to N-(phosphonomethyl)glycine or a salt thereof.

MTC 6638.7 (39-21(51753)B)
PATENT

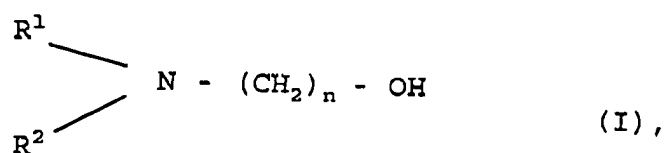
Claim 19. (Original) A process as set forth in claim 2 wherein the catalyst comprises a metal sponge and said supporting structure comprises at least about 10% by weight non-copper metal and from about 2% to about 30% by weight copper.

Claim 20. (Original) A process as set forth in claim 19 wherein said catalyst comprises a surface stratum comprising said active phase, said surface stratum containing between about 0.005 and about 0.5 grams of copper per gram of said supporting structure.

Claim 21. (Original) A process as set forth in claim 19 wherein said catalyst comprises a metal sponge support having deposited thereon a copper-containing outer stratum.

Claim 22. (Currently amended) A process as set forth in claim 19 wherein said catalyst comprises a particulate catalyst, ~~the particles of which have the structure of claim 2.~~

Claim 23. (Original) A process according to claim 19, wherein said primary alcohol comprises a compound corresponding to the formula:



wherein n is an integer ranging from 2 to 20; and R¹ and R² are independently hydrogen, hydrocarbyl, or substituted hydrocarbyl.

Claim 24. (Original) A process according to claim 23, wherein R¹ and R² are independently hydrogen; $-(\text{CH}_2)_x-(\text{CH}_3)_m$, x being an integer ranging from 0 to about 19, m being either 1 or

MTC 6638.7 (39-21(51753)B)
PATENT

2; $-(\text{CH}_2)_y\text{-OH}$, y being an integer ranging from 1 to about 20,
 $(\text{CH}_2)_z\text{-COOH}$, z being an integer ranging from 1 to about 19; or
phosphonomethyl.

Claim 25. (Original) A process according to claim 24,
wherein n is 2; R^1 is hydrogen; and R^2 is hydrogen, hydrocarbyl,
or substituted hydrocarbyl.

Claim 26. (Original) A process according to claim 25,
wherein R^2 is hydrocarbyl.

Claim 27. (Original) A process according to claim 26,
wherein R^2 is $-(\text{CH}_2)_x\text{-(CH}_3)_m$.

Claim 28. (Original) A process according to claim 27,
wherein R^2 is $-\text{CH}_3$.

Claim 29. (Original) A process according to claim 23,
wherein said primary alcohol is selected from the group
consisting of monoethanolamine, diethanolamine, and
triethanolamine.

Claim 30. (Currently amended) A process according to claim
[23] 29, wherein said process further comprises
phosphonomethylating said carboxylic acid salt to form N-
(phosphonomethyl)iminodiacetic acid or a salt thereof.

Claim 31. (Original) A process according to claim 30,
wherein said process further comprises oxidizing said N-
(phosphonomethyl)iminodiacetic acid to N-(phosphonomethyl)glycine
or a salt thereof.

MTC 6638.7 (39-21(51753)B)
PATENT

Claim 32. (Previously presented) A process as set forth in claim 19, wherein the supporting structure of said metal sponge comprises at least about 65% by weight non-copper metal.

Claim 33. (Original) A process according to claim 32, wherein said non-copper metal comprises metal having a reduction potential which is less than about +343 mVolts vs. NHE.

Claim 34. (Previously presented) A process according to claim 33, wherein said supporting structure comprises at least about 65% by weight of a non-copper metal selected from the group consisting of nickel, zinc, tin, cobalt, iron and combinations thereof.

Claim 35. (Previously presented) A process according to claim 34, wherein said supporting structure comprises at least about 65% nickel.

Claim 36. (Previously presented) A process according to claim 34, wherein said supporting structure comprises at least about 65% cobalt.

Claim 37. (Original) A process as set forth in claim 2 wherein said catalyst has a homogeneous structure containing at least about 15% by weight non-copper metal and at least about 10% by weight copper.

Claim 38. (Original) A process as set forth in claim 2 wherein said catalyst comprises a monophasic alloy containing at least about 15% by weight non-copper metal and at least about 10% by weight copper.

Claim 39. (Original) A process as set forth in claim 2 wherein said catalyst has a heterogeneous structure comprising a

MTC 6638.7 (39-21(51753)B)
PATENT

support comprising a metal containing at least about 10% by weight non-copper metal and a surface active phase containing at least about 50% by weight copper.

Claim 40. (Original) A process as set forth in claim 2 wherein said supporting structure comprises a metal sponge containing at least about 15% by weight non-copper metal and at least about 10% by weight copper.

Claim 41. (Original) A process as set forth in claim 2 wherein said catalyst comprises a surface stratum comprising said active phase, said surface stratum containing between about 0.005 and about 0.5 grams of copper per gram of said supporting structure.

Claim 42. (Original) A process as set forth in claim 2 wherein said catalyst comprises a metal sponge support having deposited thereon a copper-containing outer stratum.

Claim 43. (Original) A process as set forth in claim 42 wherein said outer stratum is deposited by a method comprising electrochemical displacement reaction between a metal of said support and copper ions.

Claim 44. (Original) A process as set forth in claim 42 wherein said outer stratum is deposited by a method comprising electroless plating of copper metal on said metal sponge support.

Claim 45. (Original) A process as set forth in claim 2 wherein said catalyst comprises a particulate catalyst.

Claim 46. (Original) A process according to claim 2, wherein said process further comprises phosphonomethylating said

MTC 6638.7 (39-21(51753)B)
PATENT

carboxylic acid salt to form N-(phosphonomethyl)iminodiacetic acid or a salt thereof.

Claim 47. (Original) A process according to claim 46, wherein said process further comprises oxidizing said N-(phosphonomethyl)iminodiacetic acid to N-(phosphonomethyl)glycine or a salt thereof.

Claim 48. (Original) A process according to claim 2, wherein said process further comprises collecting the hydrogen produced by the dehydrogenation reaction and transferring said hydrogen to a fuel cell for the production of electric power

Claim 49. (Original) A process for the preparation of a carboxylic acid salt by dehydrogenation of a primary alcohol, the process comprising:

contacting an alkaline mixture comprising said primary alcohol with a dehydrogenation catalyst, said catalyst comprising a metal sponge comprising a copper-containing active phase at the surface thereof and a supporting structure that contains at least about 10% by weight non-copper metal.

Claim 50. (Original) A process as set forth in claim 49 wherein the copper content of said surface active phase exceeds the copper content of said supporting structure.

Claim 51. (Original) A process as set forth in claim 50 wherein said surface active phase contains at least about 50% by weight copper and said supporting structure contains at least about 15% by weight non-copper metal.

Claim 52. (Original) A process as set forth in claim 50 wherein said supporting structure contains between about 2% and about 30% by weight copper.

MTC 6638.7 (39-21(51753)B)
PATENT

Claim 53. (Original) A process according to claim 52, wherein said non-copper metal comprises metal having a reduction potential which is less than about +343 mVolts vs. NHE.

Claim 54. (Previously presented) A process according to claim 52, wherein said metal support comprises at least about 10% by weight of a non-copper metal selected from the group consisting of nickel, zinc, tin, cobalt, iron and combinations thereof.

Claim 55. (Original) A process as set forth in claim 52 wherein said catalyst comprises a surface stratum comprising said active phase, said surface stratum containing between about 0.005 and about 0.5 grams of copper per gram of said supporting structure.

Claim 56. (Original) A process as set forth in claim 52 wherein said catalyst comprises a metal sponge support having deposited thereon a copper-containing outer stratum.

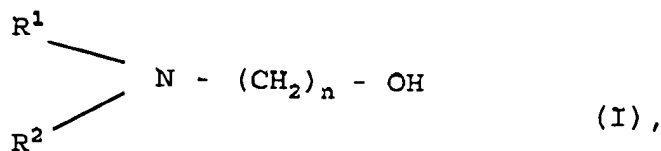
Claim 57. (Original) A process as set forth in claim 56 wherein said outer stratum is deposited by a method comprising electrochemical displacement reaction between a metal of said support and copper ions.

Claim 58. (Original) A process as set forth in claim 56 wherein said outer stratum is deposited by a method comprising electroless plating of copper metal on said metal sponge support.

Claim 59. (Original) A process as set forth in claim 52 wherein said catalyst comprises a particulate catalyst.

MTC 6638.7 (39-21(51753)B)
PATENT

Claim 60. (Original) A process according to claim 52, wherein said primary alcohol comprises a compound corresponding to the formula:



wherein n is an integer ranging from 2 to 20; and R¹ and R² are independently hydrogen, hydrocarbyl, or substituted hydrocarbyl.

Claim 61. (Original) A process according to claim 60, wherein R¹ and R² are independently hydrogen; -(CH₂)_x-(CH₃)_m, x being an integer ranging from 0 to about 19, m being either 1 or 2; -(CH₂)_y-OH, y being an integer ranging from 1 to about 20; (CH₂)_z-COOH, z being an integer ranging from 1 to about 19; or phosphonomethyl.

Claim 62. (Original) A process according to claim 61, wherein n is 2; R¹ is hydrogen; and R² is hydrogen, hydrocarbyl, or substituted hydrocarbyl.

Claim 63. (Original) A process according to claim 62, wherein R² is hydrocarbyl.

Claim 64. (Original) A process according to claim 63, wherein R² is -(CH₂)_x-(CH₃)_m.

Claim 65. (Original) A process according to claim 64, wherein R² is -CH₃.

Claim 66. (Original) A process according to claim 65, wherein said primary alcohol is selected from the group

MTC 6638.7 (39-21(51753)B)
PATENT

consisting of monoethanolamine, diethanolamine, and triethanolamine.

Claim 67. (Original) A process as set forth in claim 50 wherein said catalyst has a homogeneous structure containing at least about 10% by weight non-copper metal and at least about 15% by weight copper.

Claim 68. (Original) A process as set forth in claim 50 wherein said catalyst comprises a monophasic alloy containing at least about 10% by weight non-copper metal and at least about 15% by weight copper.

Claim 69. (Original) A process as set forth in claim 50 wherein said catalyst comprises a surface stratum comprising said active phase, said surface stratum containing between about 0.005 and about 0.5 grams of copper per gram of said supporting structure.

Claim 70. (Original) A process as set forth in claim 50 wherein said catalyst comprises a metal sponge support having deposited thereon a copper-containing outer stratum.

Claim 71. (Original) A process as set forth in claim 70 wherein said outer stratum is deposited by a method comprising electrochemical displacement reaction between a metal of said support and copper ions.

Claim 72. (Original) A process as set forth in claim 70 wherein said outer stratum is deposited by a method comprising electroless plating of copper metal on said metal sponge support.

Claim 73. (Original) A process as set forth in claim 50 wherein said catalyst comprises a particulate catalyst.

MTC 6638.7 (39-21(51753)B)
PATENT

Claim 74. (Original) A process according to claim 50, wherein said process further comprises phosphonomethylating said carboxylic acid salt to form N-(phosphonomethyl)iminodiacetic acid or a salt thereof.

Claim 75. (Original) A process according to claim 74, wherein said process further comprises oxidizing said N-(phosphonomethyl)iminodiacetic acid to N-(phosphonomethyl)glycine or a salt thereof.

Claim 76. (Original) A process according to claim 50, wherein said process further comprises collecting the hydrogen produced by the dehydrogenation reaction and transferring said hydrogen to a fuel cell for the production of electric power.

Claims 77-92. (Withdrawn)

Claim 93. (Original) A process for making a salt of a carboxylic acid, the process comprising contacting a catalyst with an alkaline mixture comprising a primary alcohol, wherein: said catalyst is characterized as being formed by a process comprising depositing a copper-containing active phase on the surface of a metal sponge support, said metal sponge support comprising at least about 60% by weight of a non-copper metal and about 2% to about 30% by weight copper.

Claim 94. (Original) A process according to claim 93, wherein said catalyst comprises a surface stratum comprising said copper-containing active phase, said surface stratum containing between about 0.005 to about 0.5 grams of copper per gram of said metal sponge support.

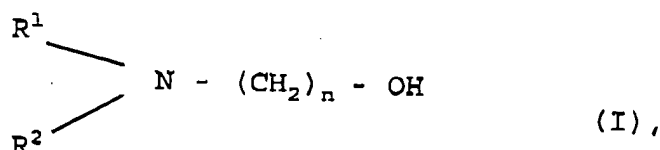
MTC 6638.7 (39-21(51753)B)
PATENT

Claim 95. (Original) A process as set forth in claim 93 wherein said catalyst has a copper-containing outer stratum deposited thereon.

Claim 96. (Original) A process according to claim 95, wherein said non-copper metal comprises metal having a reduction potential which is less than about +343 mVolts vs. NHE.

Claim 97. (Original) A process according to claim 95, wherein said copper-containing outer stratum is deposited by a method comprising electrochemical displacement reaction between a metal of said support and copper ions.

Claim 98. (Original) A process according to claim 93, wherein said primary alcohol comprises a compound corresponding to the formula:



wherein n is an integer ranging from 2 to 20; and R¹ and R² are independently hydrogen, hydrocarbyl, or substituted hydrocarbyl.

Claim 99. (Original) A process according to claim 93, wherein said carboxylic acid salt comprises an alkali metal salt of (a) iminodiacetic acid, (b) glycine, or (c) an N-alkyl-glycine.

Claim 100. (Original) A process according to claim 93, wherein said process further comprises phosphonomethylating said carboxylic acid salt to form N-(phosphonomethyl)iminodiacetic acid or a salt thereof.

MTC 6638.7 (39-21(51751)B)
PATENT

Claim 101. (Original) A process according to claim 100, wherein said process further comprises oxidizing said N-(phosphonomethyl)iminodiacetic acid to N-(phosphonomethyl)glycine or a salt thereof.

Claims 102-168. (Canceled)

Claim 169 (new). A process as set forth in claim 8, wherein the supporting structure comprises at least about 65% by weight non-copper metal.

Claim 170 (new). A process according to claim 169, wherein said non-copper metal comprises metal having a reduction potential which is less than about +343 mVolts vs. NHE.

Claim 171 (new). A process according to claim 170, wherein said supporting structure comprises at least about 65% by weight of a non-copper metal selected from the group consisting of nickel, zinc, tin, cobalt, iron and combinations thereof.

Claim 172 (new). A process according to claim 171, wherein said supporting structure comprises at least about 65% nickel.

Claim 173 (new). A process according to claim 171, wherein said supporting structure comprises at least about 65% cobalt.

Claim 174 (new). A process as set forth in claim 8, wherein the supporting structure comprises at least about 80% by weight non-copper metal.

Claim 175 (new). A process as set forth in claim 8, wherein the supporting structure comprises at least about 85% by weight non-copper metal.

MTC 6638.7 (39-21(51753)B)
PATENT

Claim 176 (new). A process as set forth in claim 8, wherein the supporting structure comprises at least about 90% by weight non-copper metal.